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Johnson et al.

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(54) **FUEL AND OIL MIXING DEVICE**

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(51) **Int. Cl.**
B01F 5/04 (2006.01)

(52) **U.S. Cl.** **222/145.5**; 222/145.7; 222/454; 222/457; 137/896

(58) **Field of Classification Search** 222/144.5, 222/145.5–145.7, 145.1, 165–166, 636, 437, 222/444, 454, 457
See application file for complete search history.

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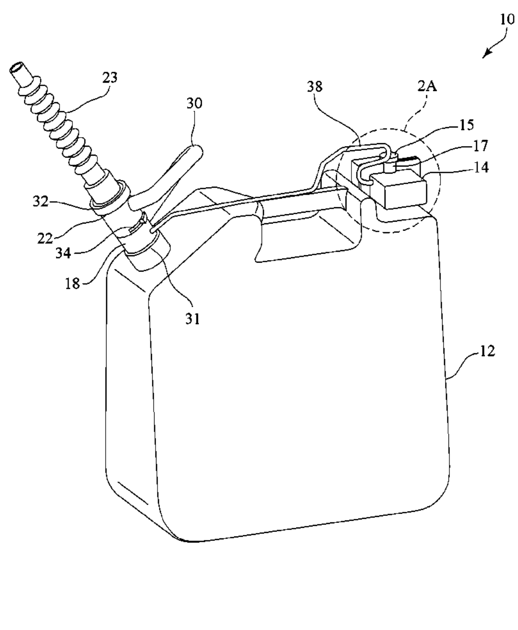
(57) **ABSTRACT**

A fuel and oil mixing device holds a quantity of fuel and oil and allows a user to easily select the ratio of fuel to oil in the mixture that exits the device, thus allowing a single device to be used to fill multiple two-stroke engines. The fuel and oil mixing device includes a mixing chamber defining an internal volume, a fuel intake opening, an oil intake opening, and an outlet. Fuel is delivered into the mixing chamber from the fuel reservoir through the fuel intake opening, while oil is delivered into the mixing chamber through the oil intake opening. An oil control valve controls oil flowing into the mixing chamber through the oil intake opening so as to allow the user to dispense a fuel-oil mixture through the outlet of the mixing chamber with a predetermined fuel-to-oil ratio.

19 Claims, 8 Drawing Sheets



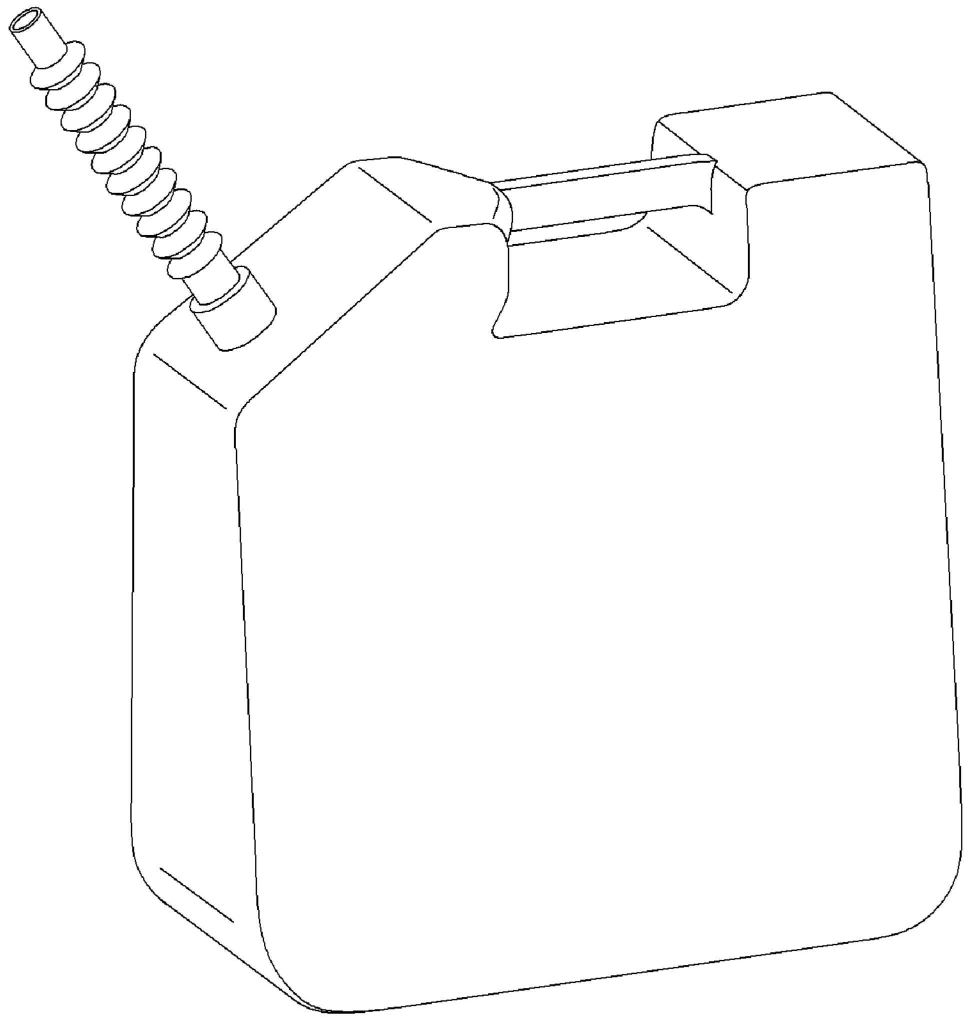


FIG. 1
(PRIOR ART)

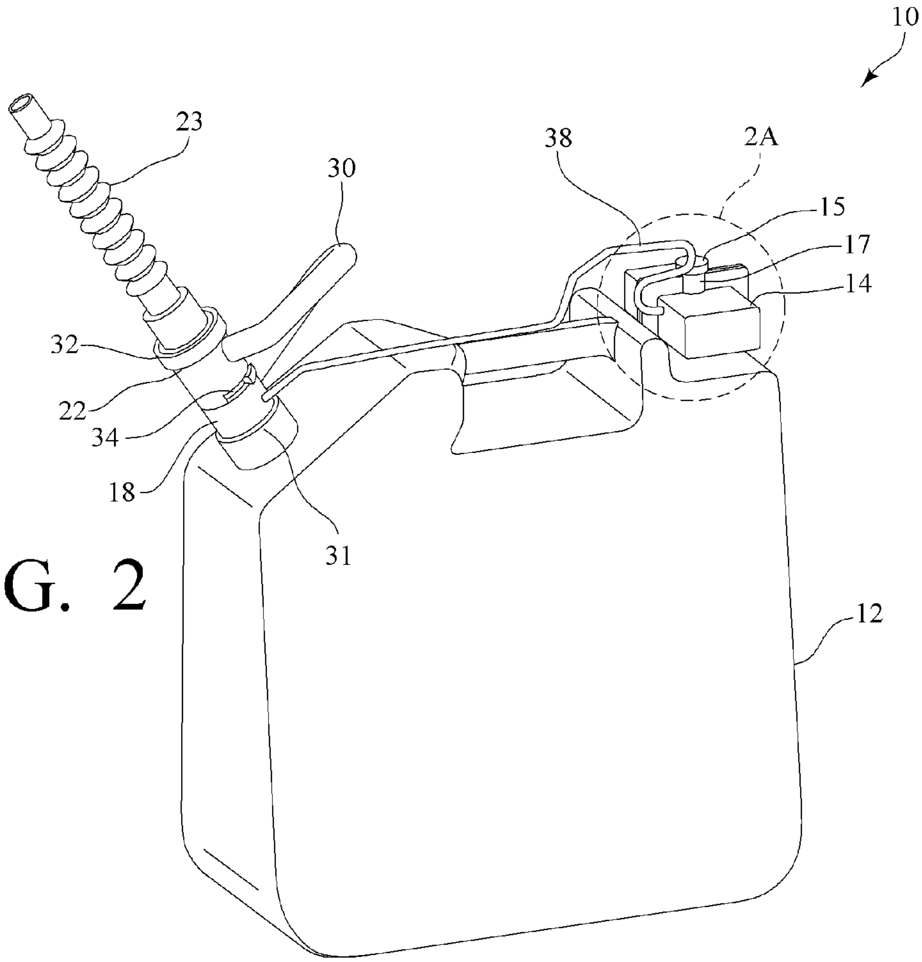


FIG. 2

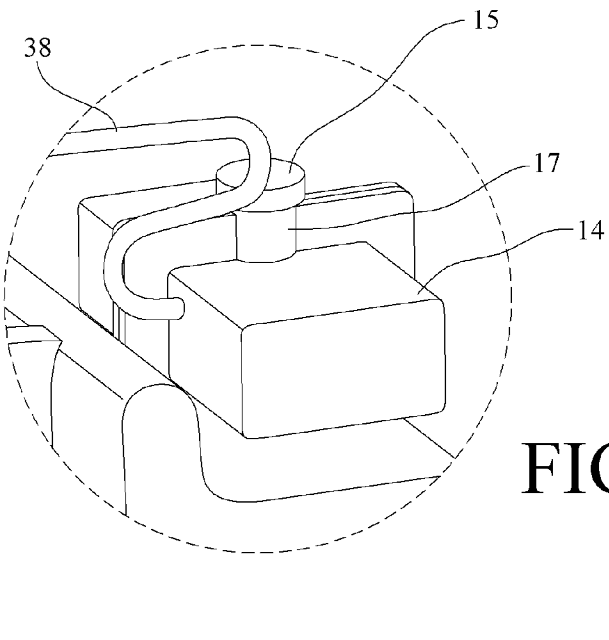


FIG. 2A

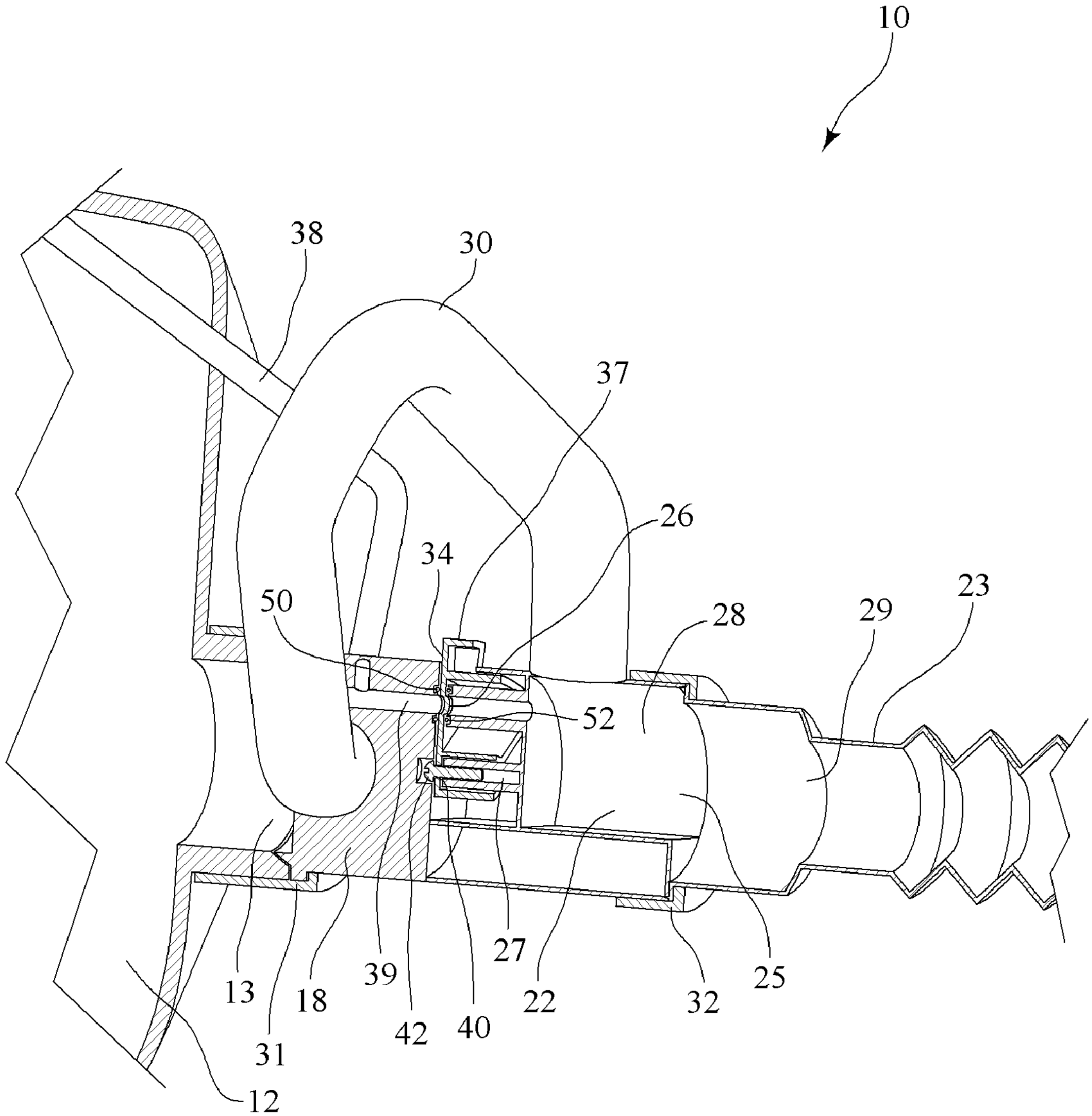


FIG. 3

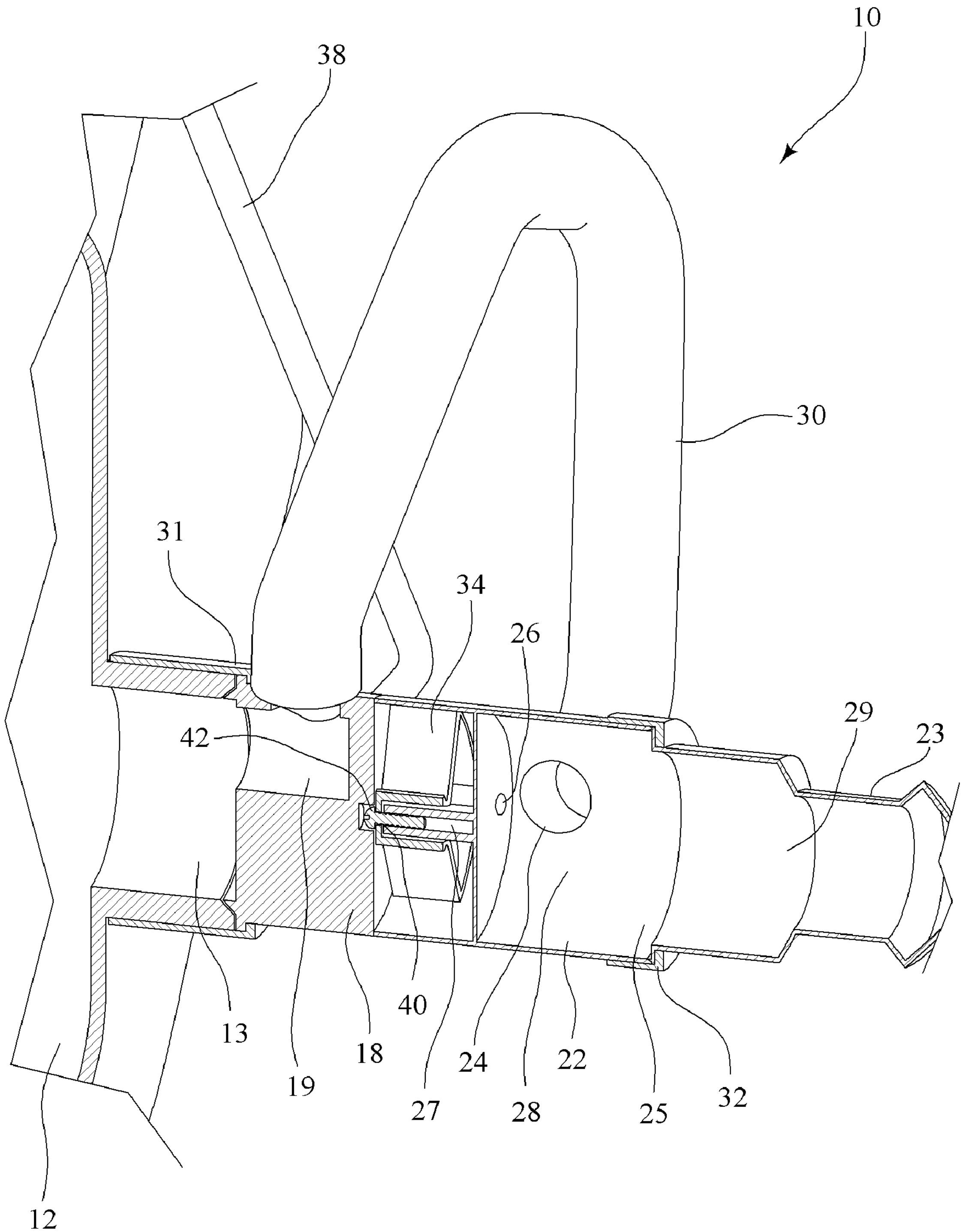


FIG. 4

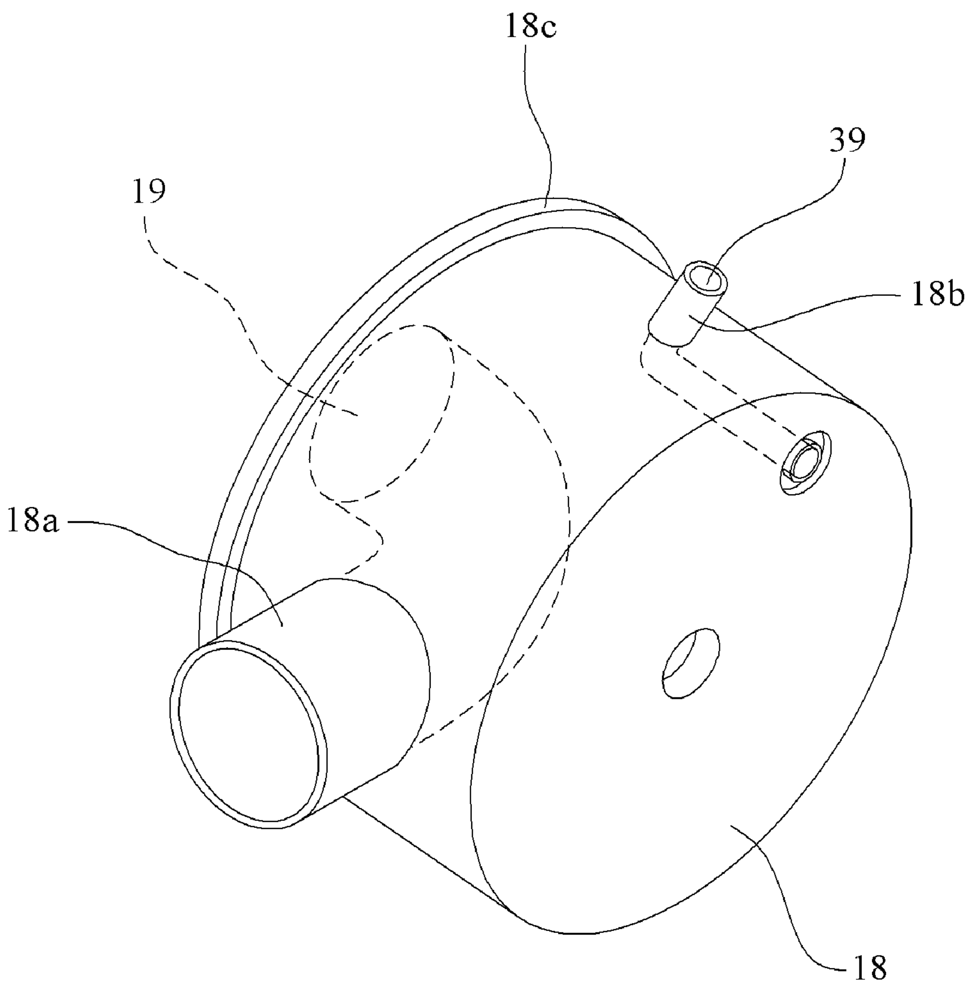


FIG. 5

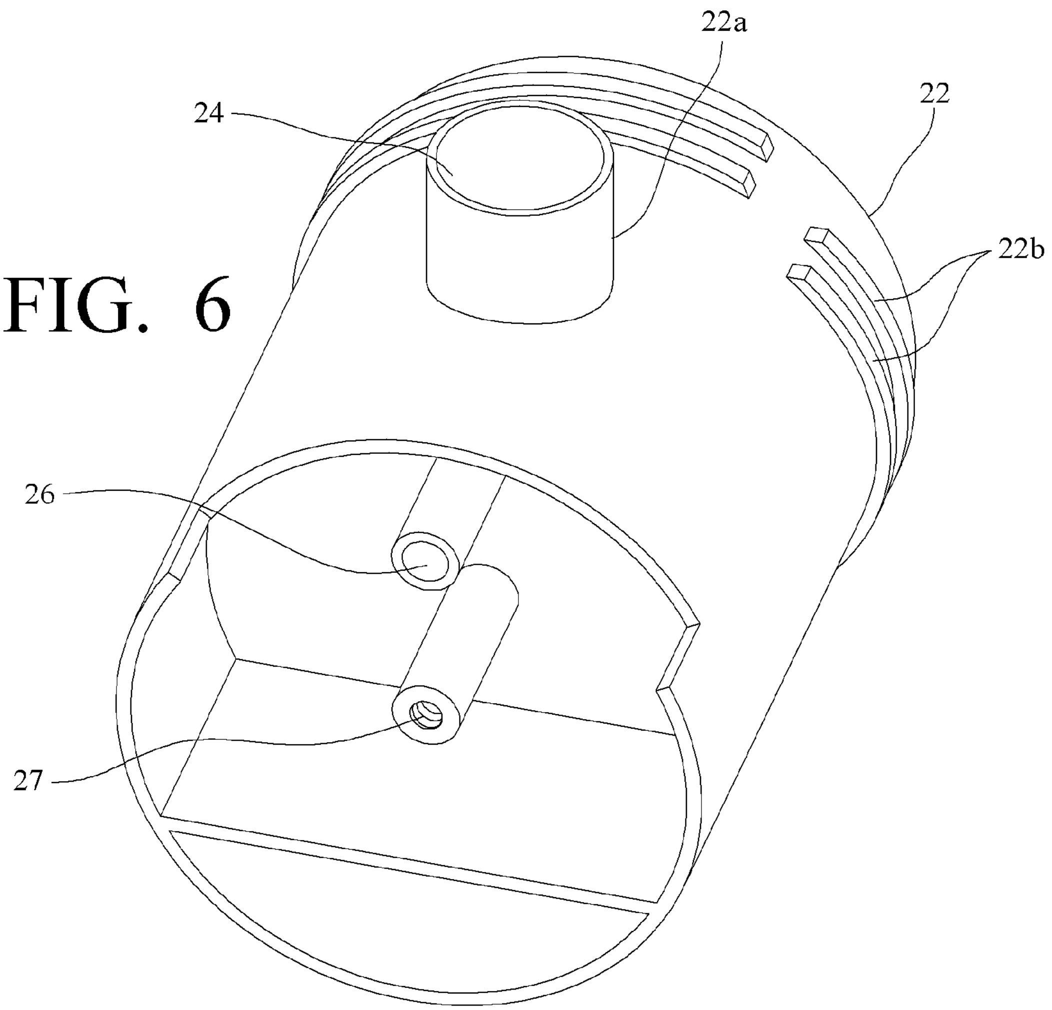


FIG. 6

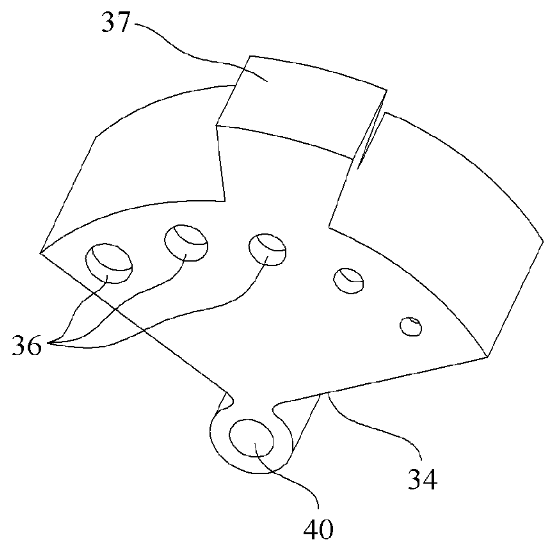


FIG. 7

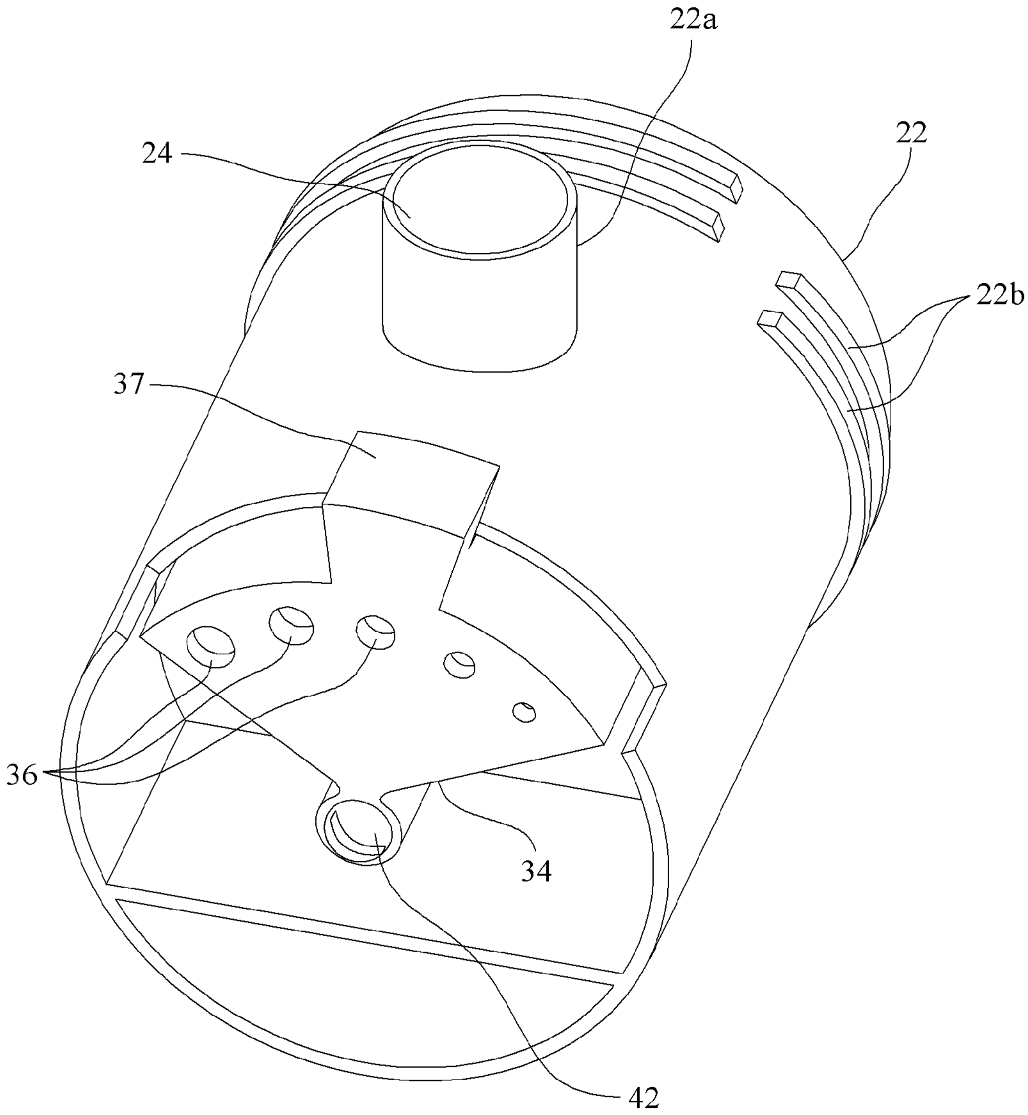


FIG. 8

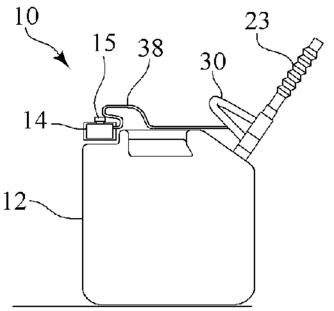


FIG 9A

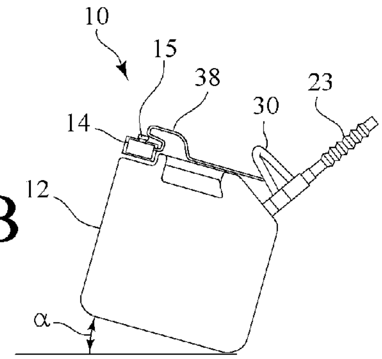


FIG 9B

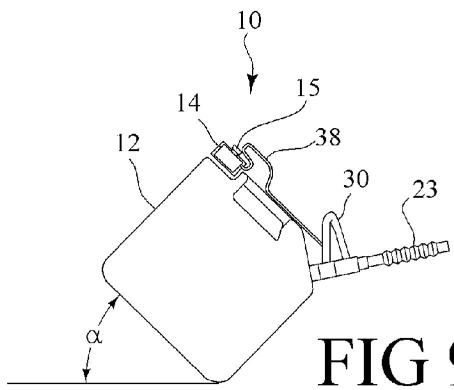


FIG 9C

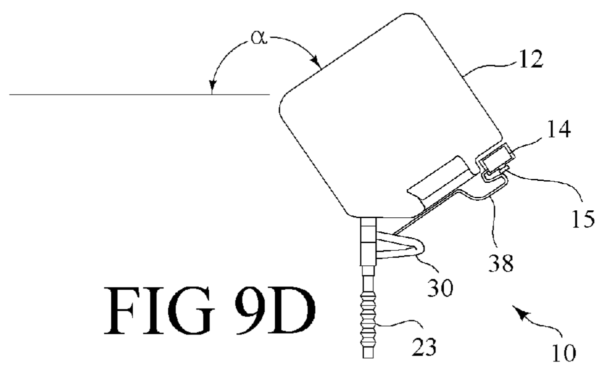


FIG 9D

FUEL AND OIL MIXING DEVICE

CROSS-REFERENCE TO RELATED APPLICATIONS

The present application claims priority to U.S. Provisional Patent Application Ser. No. 60/803,268 filed on May 26, 2006, the entire disclosure of which is incorporated herein by reference.

BACKGROUND OF THE INVENTION

Two-stroke engines are generally lighter, simpler, and less expensive than four-stroke or diesel engines. Therefore, many devices utilize two-stroke engines. For instance, radio-controlled toys, small outboard boat motors, jet skis, off-road motorcycles, and lawn and garden equipment (e.g., chain saws, leaf blowers, and weed trimmers) typically employ a two-stroke engine. Although the above-mentioned advantages lead to the widespread use of two-stroke engines, these engines possess disadvantages as well. For instance, in a four-stroke engine, the crankcase is completely separate from the combustion chamber, so the crankcase can be filled with oil to lubricate the engine. On the other hand, a two-stroke engine includes no separate oil chamber. To lubricate a two-stroke engine, oil must be mixed into the fuel that is introduced into the engine. Without the proper amount of oil in the fuel-oil mixture, a two-stroke engine will quickly seize and malfunction. Consequently, great care must be taken to ensure that the proper ratio of fuel to oil is in the mixture that is introduced into the engine.

In most cases, fuel and oil are maintained in separate containers, and then manually metered into and mixed in a third container. This task not only requires multiple containers, but it can also be messy and difficult. Such difficulty in mixing the fuel and oil for a two-stroke engine is exacerbated by the fact that many people own more than one device that employs a two-stroke engine. Since each two-stroke engine generally requires its own particular ratio of fuel to oil, owners of more than one device using a two-stroke engine must repeat the aforementioned mixing process for each device.

Accordingly, there remains a need in the art for a fuel and oil mixing device that allows a user to accurately and quickly mix the proper amounts of fuel and oil for multiple devices employing a two-stroke engine.

SUMMARY OF THE INVENTION

The present invention is a fuel and oil mixing device that holds a quantity of fuel and oil and allows a user to easily select the ratio of fuel to oil in the mixture that exits the device, thus allowing a single device to be used to fill multiple two-stroke engines.

An exemplary fuel and oil mixing device includes a fuel reservoir for holding a quantity of fuel, with this fuel reservoir defining an opening for exit of the fuel. An oil reservoir is secured to and supported by the fuel reservoir, and holds a quantity of oil. The oil reservoir includes an opening which allows oil to exit from the oil reservoir through a generally S-shaped oil trap, which defines as a pathway for oil from the oil reservoir to the remaining components of the device, as is further described below.

A fuel control valve is generally cylindrical in shape and defines a fuel conduit, that, when assembled with the remaining components of the fuel and oil mixing device, is in registry with the opening through which fuel exits the fuel reservoir. A mixing chamber is then connected to the fuel control valve, such that fuel will flow through the fuel control valve and into the mixing chamber via a generally U-shaped fuel trap. The fuel control valve is secured to the fuel reservoir through the use of a collar, which is assembled around the fuel control valve, engaging an integral circumferential lip of the fuel control valve, with the collar including internal threads for mating with external threads on the fuel reservoir.

The mixing chamber is generally cylindrical in shape and defines an internal volume. The mixing chamber also defines a fuel intake opening, an oil intake opening, and a screw-receiving boss. Finally, the mixing chamber defines an outlet, which is in registry with a conduit defined by a spout, with the fuel-oil mixture exiting the device through the spout. The spout is secured to the mixing chamber through the use of another collar. This collar is assembled around the spout and includes internal threads for mating with external threads on the mixing chamber.

The generally U-shaped fuel trap connects the conduit defined by the fuel control valve and the fuel intake opening of the mixing chamber. In other words, the fuel trap defines a pathway for delivering fuel from the fuel control valve to the mixing chamber.

The oil control valve is mounted on the mixing chamber for controlling oil flowing to the internal volume through the oil intake opening. The oil control valve defines an opening in registry with the screw-receiving boss of the mixing chamber to receive a screw or a similar fastener to secure the oil control valve to the mixing chamber. The oil control valve defines multiple orifices, each having a different diameter that corresponds to a flow of oil for a predetermined fuel-to-oil ratio. The oil control valve is also fan-shaped and designed to pivot about the axis defined by the screw, such that a user can selectively place any of the orifices defined by the oil control valve in registry with the oil intake opening defined by the mixing chamber. As such, a pathway is defined for oil from the oil reservoir, through the oil trap and the conduit defined through the fuel control valve, through a selected orifice of the oil control valve, and then into the mixing chamber via the oil intake opening.

To use the exemplary fuel and oil mixing device, a user places a predetermined amount of fuel and oil in the respective reservoirs. The user then adjusts the oil control valve such that the orifice with the proper diameter for achieving the desired fuel-to-oil ratio is in registry with both the oil intake opening in the mixing chamber and the oil conduit defined by the fuel control valve. To assist the user in adjusting the oil control valve, the oil control valve preferably includes an extension that serves as a knob or control for facilitating rotation of the oil control valve by a user. To further assist the user in selecting the proper setting, each orifice of the oil control valve preferably includes a marking that is viewable by the user and corresponds to its particular fuel-to-oil ratio. The oil control valve may also be rotated into a position such that the oil intake opening is completely blocked, so that only fuel will be introduced into the mixing chamber, allowing the device to be used as a traditional fuel dispenser.

In any event, when the fuel and oil mixing device is in a generally horizontal orientation, oil and fuel do not flow. As the user tilts the device, the S-shape of the oil trap prevents oil from prematurely flowing through the oil trap to the internal volume of the mixing chamber. Likewise, the U-shape of the fuel trap prevents fuel from prematurely flowing through the fuel trap to the internal volume of the mixing chamber.

As the tilt angle becomes greater, oil travels through the oil trap and the conduit defined through the fuel control valve until it reaches the oil control valve. As the oil passes through the selected orifice of the oil control valve, the diameter of the orifice regulates the flow of oil into the internal volume of the mixing chamber. Simultaneously, fuel flows from the fuel reservoir through the conduit in the fuel control valve. The conduit is sized to appropriately restrict the flow of fuel traveling to the fuel trap. The fuel travels through the fuel trap and into the internal volume of the mixing chamber. The fuel trap is configured such that the fuel flowing from the fuel reservoir into the internal volume of the mixing chamber is coordinated with the flow of oil into the internal volume of the mixing chamber so the proper amounts of fuel and oil are delivered into the spout, notwithstanding the amount of fuel or oil remaining in each respective reservoir.

As the tilt angle increases further still, the fuel-oil mixture flows out of the outlet of the mixing chamber into the spout. The spout is corrugated to create turbulence for continued mixing of the oil and fuel and to allow for increased flexibility of the spout.

Thus, the fuel and oil mixing device of the present invention allows a user to easily select the ratio of fuel to oil in the mixture that exits the device, thereby allowing a single device to be used to fill multiple two-stroke engines.

DESCRIPTION OF THE DRAWINGS

FIG. **1** is a perspective view of a common, prior art fuel reservoir;

FIG. **2** is a perspective view of an exemplary fuel and oil mixing device made in accordance with the present invention;

FIG. **2**A is an enlarged perspective view of a portion of the exemplary fuel and oil mixing device of FIG. **2**, illustrating the oil reservoir;

FIG. **3** is a cross-sectional perspective view of a portion of the exemplary fuel and oil mixing device of FIG. **2**;

FIG. **4** is another cross-sectional perspective view of a portion of the exemplary fuel and oil mixing device of FIG. **2**;

FIG. **5** is a perspective view of the fuel control valve of the exemplary fuel and oil mixing device of FIG. **2**;

FIG. **6** is a perspective view of the mixing chamber of the exemplary fuel and oil mixing device of FIG. **2**;

FIG. **7** is a perspective view of the oil control valve of the exemplary fuel and oil mixing device of FIG. **2**;

FIG. **8** is a perspective view of the oil control valve mounted on the mixing chamber in the exemplary fuel and oil mixing device of FIG. **2**; and

FIGS. **9**A-**9**D are a series of illustrations demonstrating the use of the exemplary fuel and oil mixing device of FIG. **2**.

DETAILED DESCRIPTION OF THE INVENTION

The present invention is a fuel and oil mixing device that holds a quantity of fuel and oil and allows a user to easily select the ratio of fuel to oil in the mixture that exits the device, thus allowing a single device to be used to fill multiple two-stroke engines.

FIG. **1** is a perspective view of a common, prior art fuel reservoir or container, i.e., a "gas can." In most cases, fuel and oil can be maintained in separate gas cans, and then manually metered into and mixed in a third gas can. Because many people own more than one device that employs a two-stroke engine and each two-stroke engine generally requires its own particular ratio of fuel to oil, owners of more than one device using a two-stroke engine must have numerous prior art gas cans that are individually tailored to particular two-stroke engines. Thus, a single device that can be used to fill multiple two-stroke engines would be more flexible than prior art gas cans.

Referring now to FIGS. **2**-**4**, an exemplary fuel and oil mixing device **10** includes a fuel reservoir **12** for holding a quantity of fuel, with this fuel reservoir **12** defining an opening **13** for exit of the fuel, as is further described below. An oil reservoir **14** is secured to and supported by the fuel reservoir **12**, and holds a quantity of oil. The oil reservoir **14** is positioned near the rear of the fuel reservoir **12**, such that potential energy is produced in the oil when the fuel and oil mixing device **10** is manipulated and tilted forward to dispense fuel from the fuel reservoir **12**.

Referring now to FIG. **2**A, the oil reservoir **14** defines an exterior fill hole **17** and an opening (not shown), which allows oil to exit from the oil reservoir **14** through a generally S-shaped oil trap **38**, which defines a pathway for oil from the oil reservoir **14** to the remaining components of the device **10**, as is further described below. The exterior fill hole **17** is preferably fitted with a screw cap **15**, which may include a vent (not shown) to prevent a vacuum in the oil reservoir **14** as the oil exits the reservoir **14** through the oil trap **38**.

Referring now to FIGS. **3**-**4** and the view of the fuel control valve **18** in FIG. **5**, the fuel control valve **18** is generally cylindrical in shape and defines a fuel conduit **19**, that, when assembled with the remaining components of the fuel and oil mixing device **10** (as best shown in FIG. **4**), is in registry with the opening **13** through which fuel exits the fuel reservoir **12**. A mixing chamber **22** is then connected to the fuel control valve **18**, such that fuel will flow through the a fuel conduit **19** defined by the fuel control valve **18** and into the mixing chamber **22** via a generally U-shaped fuel trap **30**, as is further described below. With respect to the connection of the mixing chamber **22** to the fuel control valve **18**, various fasteners and/or an adhesive could be used to connect these two components. For example, although not shown in the Figures, it is contemplated that one or both of the mixing chamber **22** and the fuel control valve **18** could be provided with integral projections or tabs that would mate with corresponding slots on the other component, effectively locking the mixing chamber **22** to the fuel control valve **18** together.

In any event, a conduit **39** is also defined through the fuel control valve **18** for the passage of oil from the oil trap **38**. In this regard, the fuel control valve **18** includes a protrusion **18***b* in registry with the conduit **39**, so that the distal end of the oil trap **38** can be pressed over and into engagement with the protrusion **18***b*.

Finally, the fuel control valve **18** is secured to the fuel reservoir **12** through the use of a collar **31**. The collar **31** is assembled around the fuel control valve **18**, engaging an integral circumferential lip **18***c* of the fuel control valve **18**, with the collar **31** including internal threads for mating with external threads (not shown) on the fuel reservoir **12**, much in the same manner that a spout is secured to a common, prior art fuel reservoir or container. Specifically, the fuel reservoir **12** includes an angled or chamfered surface on the inner circumference of the opening **13**. Thus, when the collar **31** is assembled around the fuel control valve **18**, the circumferential lip **18***c* of the fuel control valve **18** is pressed into engagement with the angled or chamfered surface to form a leak-proof seal.

Referring now to FIGS. **3**, **4**, and **6**, the mixing chamber **22** is also generally cylindrical in shape and defines an internal volume **28**. The mixing chamber **22** also defines a fuel intake opening **24**, an oil intake opening **26**, and a screw-receiving boss **27**. Finally, as best illustrated in FIGS. **3** and **4**, the mixing chamber **22** defines an outlet **25**, which is in registry with a conduit **29** defined by a spout **23**, with the fuel-oil mixture exiting the device **10** through the spout **23**, as is further described below. The spout **23** is secured to the mixing chamber **22** through the use of another collar **32**. Similar to the collar **31** that secures the fuel control valve **18** to the fuel reservoir **12**, this collar **32** is assembled around the spout **23** and includes internal threads for mating with external threads **22***b* on the mixing chamber **22**, with a leak-proof seal being formed between the mixing chamber **22** and the spout **23**.

Referring now to FIGS. **2**-**6**, the generally U-shaped fuel trap **30** connects the conduit **19** defined by the fuel control valve **18** and the fuel intake opening **24** of the mixing chamber **22** for delivering fuel to the internal volume **28**. In other words, the fuel trap **30** defines a pathway for delivering fuel from the fuel control valve **18** to the mixing chamber **22**. In this regard, and as best illustrated in FIG. **5**, the fuel control valve **18** includes a protrusion **18***a* in registry with the conduit **19**. Similarly, and as best illustrated in FIG. **6**, the mixing chamber **22** includes a protrusion **22***a* circumscribing the fuel intake opening **24**. The fuel trap **30** is preferably comprised of rubber or a similar material with some flexibility, and having an internal diameter slightly less than the external diameter of the protrusions **18***a*, **22***a*, so that the respective ends of the fuel trap **30** can be pressed over and into engagement with the protrusions **18***a*, **22***a*.

Referring still to FIGS. **2**-**4** and the views of the oil control valve **34** in FIGS. **7** and **8**, the oil control valve **34** is mounted on the mixing chamber **22** for controlling oil flowing to the internal volume **28** through the oil intake opening **26**. The oil control valve **34** defines an opening **40** (as illustrated in FIG. **6**) in registry with the screw-receiving boss **27** of the mixing chamber **22** to receive a screw **42** or a similar fastener to secure the oil control valve **34** to the mixing chamber **22**. The oil control valve **34** defines multiple orifices **36**, as best illustrated in FIG. **7**, each having a different diameter that corresponds to a flow of oil for a predetermined fuel-to-oil ratio. The oil control valve **34** is also fan-shaped and designed to pivot about the axis defined by the screw **42**, such that a user can selectively place any of the orifices **36** defined by the oil control valve **34** in registry with the oil intake opening **26** defined by the mixing chamber **22**. As such, a pathway is defined for oil from the oil reservoir **14**, through the oil trap **38** and the conduit **39** defined through the fuel control valve **18**, through a selected orifice **36** of the oil control valve **34**, and then into the mixing chamber **22** via the oil intake opening **26**. In this regard, and as best illustrated in FIG. **3**, an o-ring **50** is preferably used as a seal at the interface between the fuel control valve **18** and the oil control valve **34**, while a similar o-ring **52** is preferably used as a seal at the interface between the oil control valve **34** and the oil intake opening **26** of the mixing chamber **22**.

Referring now to FIGS. **9**A-**9**D, to use the exemplary fuel and oil mixing device **10**, a user places a predetermined amount of fuel and oil in the respective reservoirs **12**, **14**. The user then adjusts the oil control valve **34** such that an orifice **36** with the proper diameter for achieving the desired fuel-to-oil ratio is in registry with both the oil intake opening **26** in the mixing chamber **22** and the oil conduit **39** defined by the fuel control valve **18**. To assist the user in adjusting the oil control valve **34**, the oil control valve **34** preferably includes an extension **37** that serves as a knob or control for facilitating rotation of the oil control valve **34** by a user. To further assist the user in selecting the proper setting, each orifice **36** of the oil control valve **34** preferably includes a marking (not shown) that is viewable by the user and corresponds to its particular fuel-to-oil ratio. The oil control valve **34** may also be rotated into a position such that the oil intake opening **26** is completely blocked, so that only fuel will be introduced into the mixing chamber **22**, allowing the device **10** to be used as a traditional fuel dispenser.

In any event, when the fuel and oil mixing device **10** is in a generally horizontal orientation as in FIG. **9**A (tilt angle, $\alpha=0$), oil and fuel do not flow. As the user tilts the device **10**, as in FIG. **9**B, the S-shape of the oil trap **38** prevents oil from prematurely flowing through the oil trap **38** to the internal volume **28** of the mixing chamber **22**. Likewise, the U-shape of the fuel trap **30** prevents fuel from prematurely flowing through the fuel trap **30** to the internal volume **28** of the mixing chamber **22**.

As the tilt angle, α, becomes greater, as in FIG. **9**C, oil travels through the oil trap **38** and the conduit **39** defined through the fuel control valve **18** until it reaches the oil control valve **34**. As the oil passes through the selected orifice **36** of the oil control valve **34**, the diameter of the orifice **36** regulates the flow of oil into the internal volume **28** of the mixing chamber **22**. Simultaneously, fuel flows from the fuel reservoir **12** through the conduit **19** defined through the fuel control valve **18**. The conduit **19** is sized to appropriately restrict the flow of fuel traveling to the fuel trap **30**. The fuel travels through the fuel trap **30** and into the internal volume **28** of the mixing chamber **22**. The fuel trap **30** is configured such that the fuel flowing from the fuel reservoir **12** into the internal volume **28** of the mixing chamber **22** is coordinated with the flow of oil into the internal volume **28** of the mixing chamber **22** so the proper amounts of fuel and oil are delivered into the spout **23**, notwithstanding the amount of fuel or oil remaining in each respective reservoir **12**, **14**. Thus, fuel flowing through the fuel trap **30** to the internal volume **28** mixes with oil flowing through the oil control valve **34** to the internal volume **28** and a mixture of fuel and oil flows out of the outlet **25**.

As the tilt angle, α, increases further still, as in FIG. **9**D, the fuel-oil mixture flows out of the outlet **25** of the mixing chamber **22** into the spout **23**. The spout **23** is corrugated to create turbulence for continued mixing of the oil and fuel and to allow for increased flexibility of the spout **23**.

Thus, the fuel and oil mixing device **10** of the present invention allows a user to easily select the ratio of fuel to oil in the mixture that exits the device **10**, thereby allowing a single device to be used to fill multiple two-stroke engines.

One of ordinary skill in the art will recognize that additional embodiments are also possible without departing from the teachings of the present invention. This detailed description, and particularly the specific details of the exemplary embodiment disclosed therein, is given primarily for clarity of understanding, and no unnecessary limitations are to be understood therefrom, for modifications will become obvious to those skilled in the art upon reading this disclosure and may be made without departing from the spirit or scope of the invention.

What is claimed is:

1. A fuel and oil mixing device, comprising:

a fuel reservoir for holding a quantity of fuel and defining an opening for exit of said fuel;

an oil reservoir secured to said fuel reservoir for holding a quantity of oil and defining an opening for exit of said oil;

a fuel control valve connected to the fuel reservoir, said fuel control valve defining a fuel conduit in registry with the opening defined by the fuel reservoir for exit of said fuel and further defining an oil conduit;

a mixing chamber defining an internal volume, said mixing chamber being connected to the fuel control valve at one end and connected to a spout at another end, said mixing chamber further defining a fuel intake opening, an oil intake opening, and an outlet in registry with the spout;

a fuel trap connecting the fuel intake opening of the mixing chamber and the fuel conduit defined by the fuel control valve for delivering said fuel from the fuel control valve to the mixing chamber, wherein said fuel trap is generally U-shaped to prevent said fuel from prematurely flowing through said fuel trap into the mixing chamber;

an oil control valve defining a multiplicity of orifices, each of which can be selectively placed in registry with the oil intake opening defined by said mixing chamber and the oil conduit defined by said fuel control valve, and each of the multiplicity of orifices corresponding to a predetermined fuel-to-oil ratio; and

an oil trap connected between said oil reservoir and the oil conduit defined by said fuel control valve;

wherein, as a user tilts the fuel and oil mixing device forward, fuel flowing into the mixing chamber through the fuel intake opening mixes with oil flowing into the mixing chamber through the oil intake opening, with a fuel-oil mixture exiting through the outlet of the mixing chamber with a fuel-to-oil ratio determined by the orifice selected and placed in registry with the oil intake opening defined by said mixing chamber and the oil conduit defined by said fuel control valve.

2. A fuel and oil mixing device, comprising:

a fuel reservoir for holding a quantity of fuel and defining an opening for exit of said fuel;

an oil reservoir secured to said fuel reservoir for holding a quantity of oil and defining an opening for exit of said oil;

a fuel control valve connected to the fuel reservoir, said fuel control valve defining a fuel conduit in registry with the opening defined by the fuel reservoir for exit of said fuel and further defining an oil conduit;

a mixing chamber defining an internal volume, said mixing chamber being connected to the fuel control valve at one end and connected to a spout at another end, said mixing chamber further defining a fuel intake opening, an oil intake opening, and an outlet in registry with the spout;

a fuel trap connecting the fuel intake opening of the mixing chamber and the fuel conduit defined by the fuel control valve for delivering said fuel from the fuel control valve to the mixing chamber;

an oil control valve defining a multiplicity of orifices, each of which can be selectively placed in registry with the oil intake opening defined by said mixing chamber and the oil conduit defined by said fuel control valve, and each of the multiplicity of orifices corresponding to a predetermined fuel-to-oil ratio; and

an oil trap connected between said oil reservoir and the oil conduit defined by said fuel control valve, wherein said oil trap is generally S-shaped to prevent said oil from prematurely flowing through said oil trap into the mixing chamber;

wherein, as a user tilts the fuel and oil mixing device forward, fuel flowing into the mixing chamber through the fuel intake opening mixes with oil flowing into the mixing chamber through the oil intake opening, with a fuel-oil mixture exiting through the outlet of the mixing chamber with a fuel-to-oil ratio determined by the orifice selected and placed in registry with the oil intake opening defined by said mixing chamber and the oil conduit defined by said fuel control valve.

3. The fuel and oil mixing device of claim **1**, wherein said oil control valve pivots about an axis, such that the user can selectively place any of the orifices defined by the oil control valve in registry with the oil intake opening defined by said mixing chamber and the oil conduit defined by said fuel control valve by rotating said oil control valve.

4. The fuel and oil mixing device of claim **3**, wherein said oil control valve includes an extension that serves as a knob for facilitating rotation of said oil control valve by the user.

5. The fuel and oil mixing device of claim **3**, wherein said oil control valve can be rotated into a position such that the oil intake opening is completely blocked, so that only fuel will be introduced into the mixing chamber.

6. A fuel and oil mixing device, comprising:

a fuel reservoir for holding a quantity of fuel;

an oil reservoir secured to said fuel reservoir for holding a quantity of oil;

a mixing chamber secured to said fuel reservoir, and defining an internal volume, a fuel intake opening, an oil intake opening, and an outlet;

a fuel trap for delivering fuel into the mixing chamber from the fuel reservoir through the fuel intake opening, wherein said fuel trap is generally U-shaped to prevent said fuel from prematurely flowing through said fuel trap into the mixing chamber;

a means for delivering oil into the mixing chamber from the oil reservoir through the oil intake opening; and

an oil control valve for controlling oil flowing into the mixing chamber through the oil intake opening and defining a multiplicity of orifices, each which can be selectively placed in registry with the oil intake opening of said mixing chamber, and each of the multiplicity of orifices corresponding to a predetermined fuel-to-oil ratio;

wherein, as a user tilts the fuel and oil mixing device forward, fuel flowing into the mixing chamber through the fuel intake opening mixes with oil flowing into the mixing chamber through the oil intake opening, with a fuel-oil mixture exiting through the outlet of the mixing chamber with a fuel-to-oil ratio determined by the orifice selected and placed in registry with the oil intake opening of said mixing chamber.

7. The fuel and oil mixing device of claim **6**, and further comprising a fuel control valve interposed between said fuel reservoir and said mixing chamber, said fuel control valve defining a fuel conduit in registry with an opening defined by the fuel reservoir for exit of said fuel from said fuel reservoir, said fuel conduit delivering fuel to said fuel trap, which then delivers fuel into the mixing chamber through the fuel intake opening.

8. The fuel and oil mixing device of claim **7**, wherein said means for delivering oil into the mixing chamber from the oil reservoir includes: an oil trap extending from the oil reservoir to said fuel control valve and an oil conduit defined through said fuel control valve.

9. The fuel and oil mixing device of claim **8**, wherein said oil trap is generally S-shaped to prevent said oil from prematurely flowing through said oil trap into the mixing chamber.

10. The fuel and oil mixing device of claim **6**, wherein said oil control valve pivots about an axis, such that the user can selectively place any of the orifices defined by the oil control valve in registry with the oil intake opening of said mixing chamber by rotating said oil control valve.

11. The fuel and oil mixing device of claim **10**, wherein said oil control valve includes an extension that serves as a knob for facilitating rotation of said oil control valve by the user.

12. The fuel and oil mixing device of claim **10**, wherein said oil control valve can be rotated into a position such that the oil intake opening is completely blocked, so that only fuel will be introduced into the mixing chamber.

13. The fuel and oil mixing device of claim **3**, wherein said oil control valve is generally fan-shaped, with each of the orifices defined through a face of the generally fan-shaped oil control valve.

14. The fuel and oil mixing device of claim **13**, wherein the orifices are aligned in an arc along the face of the generally fan-shaped oil control valve.

15. The fuel and oil mixing device of claim **10**, wherein said oil control valve is generally fan-shaped, with each of the orifices defined through a face of the generally fan-shaped oil control valve.

16. The fuel and oil mixing device of claim **15**, wherein the orifices are aligned in an arc along the face of the generally fan-shaped oil control valve.

17. The fuel and oil mixing device of claim **2**, wherein said oil control valve pivots about an axis, such that the user can selectively place any of the orifices defined by the oil control valve in registry with the oil intake opening defined by said mixing chamber and the oil conduit defined by said fuel control valve by rotating said oil control valve.

18. The fuel and oil mixing device of claim **17**, wherein said oil control valve includes an extension that serves as a knob for facilitating rotation of said oil control valve by the user.

19. The fuel and oil mixing device of claim **17**, wherein said oil control valve can be rotated into a position such that the oil intake opening is completely blocked, so that only fuel will be introduced into the mixing chamber.

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